DOCUMENT RESUME

ED 042 961 AC 008 512

AUTHOR	Puzzuoli, David A.
TITLE	A Study of Teaching University Extension Classes by Tele-lecture.
INSTITUTION	West Virginia Univ., Morgantown.
PUB DATE	Aug 70
NOTE	73p.
EDRS PRICE	FDRS Price MF-$0.50 HC-$3.75
DESCRIPTORS	*Academic Achievement, College Students, Comparative Analysis, *Electromechanical Aids, Elementary School Teachers, Engineering, Industrial Personnel, *Instructional Technology, Mathematics, Questionnaires, Student Attitudes, *Telephone Instruction, Televised Instruction, *University Extension
IDENTIFIERS	Mann Whitney U Test, West Virginia University

ABSTRACT

After an overview of literature on tele-lecture models, a study was made of the applicability of teaching university extension courses by tele-lecture and electrowriter. At West Virginia University, courses in mining engineering and in modern mathematics were given to college classes (control group) and also, using tele-lecture and electrowriter, to extension classes in Beckley, 265 miles distant (experimental group). Comparative analysis of the achievement of the two groups, using the T-Test and F Ratio, showed that achievement by the extension classes was equal to, or significantly greater than, that of students in the on-campus classes. Analysis of extension student questionnaire responses, using the Mann-Whitney U Test, supported the thesis that success in tele-lecture teaching is greater when the professor limits continuous lecturing to 20-25 minutes, provides printed material, uses audiovisual techniques as a supplement, makes a number of personal visits (two or three) to the class, and bases the class on problem solving techniques. (The questionnaire is included.) (DM)

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY

ED042961

A STUDY OF TEACHING UNIVERSITY EXTENSION CLASSES BY TELE-LECTURE

AC 008 512

David A. Puzzuoli
West Virginia University

ED042961

A STUDY OF TEACHING UNIVERSITY EXTENSION CLASSES BY TELE-LECTURE

David A. Puzzuoli
West Virginia University
Morgantown, W. Va.
August, 1970

PREFACE

This study was conducted by the office of Extension Credit and Non-Credit Programs, Center for Appalachian Studies and Development, West Virginia University. The study was conducted during the academic year 1969-70.

The study was designed to provide the reader with an overview of the development of tele-lecture in education during the past decade. Due to the amount and nature of the reported literature, it was necessary to present only selected studies to indicate the various uses and network models implemented for tele-lecture in education. A second part of the study was to report the results of an investigation in the use of tele-lecture for teaching university extension classes.

The author wishes to extend a note of appreciation for the cooperation and patience given by Mr. Arthur Morris, Acting Director of the Office of Extension Credit and Non-Credit Programs; Mr. Joseph W. Leonard, Director Coal Research Bureau; Dr. Boyd D. Holtan, Associate Professor of Mathematics Education, and Mrs. Donna Isner, secretary, Educational Research and Field Services.

David A. Puzzuoli
Center for Appalachian Studies and Development
West Virginia University

TABLE OF CONTENTS

	Page
INTRODUCTION	1
Tele-lecture	3
A REVIEW OF TELE-LECTURE MODELS	5
The National Scene	5
Tele-lecture Use in West Virginia	11
Summary of the Review of Literature	19
DESCRIPTION OF THE STUDY	21
Purpose of the Study	22
Limitation of the Study	23
Statement of the Problem	23
Objectives	23
Hypotheses	23
Definition of Terms	24
METHODS, PROCEDURES, AND PRESENTATION OF DATA	26
Mining Engineering 224	26
Questionnaire Results (ME 224)	27
Summary of ME 224 Responses	34
Education 308: Tele-lecture	36
Questionnaire Results (Ed. 308)	37
Summary of Ed. 308 Responses	43
Education 308: On-Campus	45
Academic Achievement	46
ANALYSIS OF DATA	49
Analysis of Student Opinion	49

Page

On-Campus versus Tele-lecture Achievement 51

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS. 54

Summary 54

Conclusions 55

Findings. 56

Recommendations 57

APPENDIX A 62

LIST OF TABLES

TABLE		Page
I	SUMMARY OF RESPONSES TO THE TELE-LECTURE QUESTIONNAIRE, M. E. 224, PART A	28
II	SUMMARY OF RESPONSES TO THE TELE-LECTURE QUESTIONNAIRE, M. E. 224, PART B, STATEMENTS 1-4	30
III	SUMMARY OF RESPONSES TO OPTIMAL TIME FOR TELE-LECTURE, ME 224.	32
IV	SUMMARY OF RESPONSES TO THE TELE-LECTURE QUESTIONNAIRE, Ed. 308, PART A	39
V	SUMMARY OF RESPONSES TO THE TELE-LECTURE QUESTIONNAIRE, Ed. 308, PART B, STATEMENTS 1-4	40
VI	SUMMARY OF RESPONSES TO OPTIMAL TIME FOR TELE-LECTURE, Ed. 308	42
VII	SUMMARY OF PRE-TEST AND POST-TEST SCORES ACHIEVED BY STUDENTS ENROLLED IN ED. 308, TELE-LECTURE, AND ED. 308, KANAWHA VALLEY GRADUATE CENTER	48
VIII	SUMMARY OF MEAN SCORES AND STANDARD DEVIATIONS ACHIEVED BY STUDENTS IN ED. 308 AS TAUGHT BY TELE-LECTURE AND ON CAMPUS AT THE KANAWHA VALLEY GRADUATE CENTER	52
IX	SUMMARY OF t-TEST VALUES BETWEEN PRE-TEST MEANS AND BETWEEN POST-TEST MEANS; SUMMARY OF CRITICAL F-RATIO VALUES FOR PRE-TEST VARIANCES AND FOR POST-TEST VARIANCES: ED. 308 STUDENTS.	52

LIST OF FIGURES

FIGURE		Page
1	ORGANIZATION OF PROPOSED OFFICE OF TELE-LECTURE PROGRAMMING .	59

TEACHING UNIVERSITY EXTENSION CLASSES BY THE TELE-LECTURE METHOD

INTRODUCTION

A historical review of American education can assist the most casual observer to conclude that dramatic changes have occurred in America's classrooms. Many of these changes have occurred in the roles/responsibilities of both the teacher and pupil. Generally speaking, from the 17th Century to today, the responsibility for learning has been shifted from the teacher to the pupil. That is, during the early period of American education it was the responsibility of the teacher to provide the "facts" and it was the responsibility of the pupil to "soak up" the facts in order to become a learned individual. Contemporary educational theories and research relating to teaching and learning have provided some evidence that learning best occurs when the teacher becomes a motivator or director for learning and the pupil becomes an inquirer into the universe of knowledge.

In addition to the evolution which has occurred between the teacher and pupil interaction, changes have occurred in the methods/techniques used by the teacher in motivating or directing the learning of pupils. During the early periods of American educational history, the only teaching/learning aid the teacher had at his command was the textbook. As education developed in America, the teacher and the pupil began to realize the value of such "tools" as a slate, blackboard, chalk, and individual textbooks for each pupil. From this minimal beginning, there has evolved a plethora of educational "tools" available for both the teacher and the pupil.

In directing the pupil's progress in learning, the teacher has avail-

able such contemporary educational "tools" as over-head projectors, 35mm slides, films, computers, radios, television, telephone, libraries, individual study carrels, programmed instruction, etc. The growth in the number and kinds of teaching/learning "tools" available has led to a new body of knowledge, Educational Technology.

With the exponential growth in Educational Technology, the practicing professional within the classroom is faced with many decisions. These decisions center around the basic questions of: (1) What is the "best educational tool" to use for a specific learning experience?; (2) What are the identifiable limitations to an "educational tool?"; (3) Is there a relationship in a specific bit of knowledge from the total universe of knowledge which can be best learned through the aid of a specific "educational tool?"; (4) Is there a relationship between the pupil's abilities or characteristics and the use of "educational tools?"

In addition to the development of new educational theories and the evolution of "educational tools," educators are constantly re-defining the concept known as school. Traditionally, the concept of school was interpreted to mean that the only way a pupil could learn was to be placed, physically, into a building containing other pupils and teachers. This interpretation is being seriously questioned by contemporary educators and the evolving definition of school appears to be one that the "school" reaches out to the community and its "pupils" through such means as mobile learning vans, television, radio, and telephonic instruments.

It appears that the evolutionary changes in education have been brought about by the overwhelming amount of knowledge mankind has

generated and the parallel growth in population. The management of both the growth in knowledge and population has been compounded by the development of contemporary learning theories and teaching methodologies. In addition, education is faced with the hard data that not only is knowledge and population increasing but the population is demanding such goals as life-long learning and a year-round education. In order to meet these new and challenging goals set by society, educators have been forced to find new ways to expand and supplement their resources; thus, the growth of Educational Technology.

Tele-Lecture

A telephonic system which appears to be growing in popularity and usage in the field of education is the tele-lecture. The tele-lecture is a two-way amplified communications system designed to bring together individuals and/or groups by means of a regular telephone network. Through the use of the tele-lecture, a speaker may present an address to one or more groups, simultaneously, located in one or more different sites across a region, state, or the Nation. The system is designed such that the speaker's voice is amplified in accord with local needs and the audience may communicate with the speaker through a series of telephonically connected microphones.

A major advantage to the tele-lecture is that time and travel conveniences, scheduling problems, and related costs are greatly reduced. Other advantages are: (1) the range and effect of a speaker is increased, (2) a number of audiences in different site locations may share a speaker, (3) over-all program costs may be reduced in that these costs may be shared with

other schools/agencies, and (4) flexibility in program implementation.

A review of the literature relating to the use of the tele-lecture indicates that the method is implemented through various models. The tele-lecture has been used with such supportive aids as slow-scan television, electro-writers, 35mm slides, over-head projectuals, reading materials, films and printed hand-outs. These aids are used to increase the breadth, impact, and specificity of the tele-lecture program.

Not only has the tele-lecture method been supported by learning aids, but implementation models have been devised and used through various network models. The network models include: (1) an external speaker presenting an address to a single group, (2) an external speaker presenting an address to a number of groups in a number of site locations, and (3) interaction of a number of speakers/audiences at a number of different site locations.

A REVIEW OF TELE-LECTURE MODELS

This section of the report provides the reader with an overview of tele-lecture models implemented both at the national level and in West Virginia. Presented are descriptions of various tele-lecture network models and tele-lecture programs which may provide the reader with a more complete knowledge of the total spectrum of tele-lecture.

The National Scene

Technically, the tele-lecture method has been used at all levels of education --- graduate, undergraduate, secondary and elementary, and adult education. The review of literature appears to indicate that the major use of the tele-lecture method has been to bring "expert opinion" to an audience. Further, there appears to be a trend toward using the tele-lecture method as a communications network between/among two or more local school districts or institutions of higher education.

Higher Education. The tele-lecture has been used for undergraduate classes to provide students with greater depth in a knowledge area by communicating with the author of a textbook or a particular subject matter expert. For example, "psychology students at the University of Omaha were able to discuss the theories and philosophies of a leading authority in their field with the scholar himself, Dr. Neil Miller...Dr. Miller spoke from New Haven...In order to be sure they (the students) would ask informed questions, the students prepared for the tele-lecture by reading special text materials suggested by Dr. Miller."[1]

---

[1] Tele-Lecture (New York: Bell Telephone System, SP85, October, 1963), p. 8.

An example of how tele-lecture can be used to discuss a technical subject was given at LaCrosse State College, Wisconsin. The subject under discussion was "The Nuclear Reactor: Its Function and Purpose." Dr. Max W. Carbin, Professor of Mechanical Engineering from the University of Wisconsin, spoke from his office in Madison. "Dr. Carbin detailed his tele-lecture by referring to a set of slides projected onto a screen for his audience at LaCrosse. The sequence of the slides shown at LaCrosse were pre-arranged by Dr. Carbin and he referred to a duplicate set used in his own office."[2]

> Dr. John L. Coleman, Professor of Economics at the Carnegie Institute of Technology, gave a tele-lecture from Pittsburgh to audiences at the Universities of Oklahoma, Syracuse, Wisconsin, Omaha, and Washington University on the subject of "Exports, Imports, Dollars and Gold." The discussion with Dr. Coleman was based on a film, "Money Talks," which was seen simultaneously at the five universities before Dr. Coleman's lecture.[3]

The above example illustrates an example of "one-shot" use of the tele-lecture. In these examples, a guest lecturer was integrated into a course of studies as a resource for the audience. The following example illustrates how the tele-lecture may be used to teach a complete course and at the same time enrich an institution of higher education's resources.

The Fund for the Advancement of Education supported an experimental tele-lecture project to bring top-level teaching to colleges which could

---

[2] Ibid., p. 9.

[3] Ibid., p. 11.

not obtain it from available sources.

> From July 9 to August 10, 1963, Dr. Moses Hadas, Head of the Department of Latin and Greek at Columbia University in New York, delivered an 18-lecture course in classical literature to students in four southern colleges via tele-lecture.
>
> The colleges participating in this tele-lecture program were Jackson State College, Jackson, Mississippi, Grambling College in Grambling, Louisiana, Southern University in Baton Rouge, Louisiana, and Tougaloo Southern Christian College, Tougaloo, Mississippi. Most of the participants were graduate students teaching at the high school level who wanted the benefit of instruction from one of the country's leading classical scholars before introducing the subject to their own students.
>
> Professor Hadas spoke from the library for the Fund for the Advancement of Education in New York. A moderator was present in the classroom at each university and before each lecture students had an opportunity to ask Professor Hadas questions about the preceding lecture. Local faculty members assisted by reading papers, grading and assigning credits. Professor Hadas suggested some questions for final examinations and before the series of lectures was completed, either he or an assistant made a personal visit to each campus.[4]

Institutions of Higher Education are also using the tele-lecture as a method to spread the influence of the institution over a wider land area. That is, instead of students attending the institution, the institution reached-out to the students through telephonic methods.

Through the use of tele-lecture, the University of California at

---

[4] Ibid.

Los Angeles presented an extension class on Computer-Assisted Instruction Systems to 30 students. The students used any telephone they had at their command---at home or the office. The first and last class meetings were held at the campus of UCLA; all the "teletaught" class meetings were taped. If a student missed a class, "he could telephone in and have the tape replayed just for him...L. C. Silvern, one of the tele-lecture instructors, points out that tele-lecture is not suitable for all courses; most especially it is not applicable for such courses as chemistry..."[5]

Cornell University's College of Engineering used a tele-lecture model which utilized the telephone and an electro-writer as a system to teach a course in physical metallurgy to a group of research and development specialists in Pennsylvania, 55 miles away. The model transmitted voice communications and hand writing over telephone lines for long distance illustrated lectures.[6]

In-service instruction for 15 Head Start teachers in 10 Appalachian communities was given through the use of tele-lecture. The 10 site locations were: Powell and Knoxville, Tennessee; Coeburn, Big Stone Gap, and Sugar Grove, Virginia; Charleston, West Virginia; Marietta, Belpre, and Fayetteville, Ohio; and Barboursville, Kentucky. The teachers were instructed in the introduction of new language arts materials into their curricula. The in-service course leader had previously met each of the teachers in the course and written correspondence between the course

---

[5]"Teaching by Telephone," Audio-Visual Instructor, 12:683-7, September, 1967.

[6]Ibid.

leader and the teachers occurred every week.[7]

Elementary and Secondary Education. It was found that elementary and secondary schools were using the tele-lecture methods similarly as in higher education. That is, the tele-lecture was used to enrich the classroom work by bringing in "expert opinion" and for communications between/among school districts. In addition, the literature reported that the tele-lecture system was used in setting up a two-way communication system between the classroom and the home or hospital bound pupil.[8]

Dr. Larry Hughes reports on two Elementary and Secondary Education Act, Title III, Projects which were designed to serve as a communication linkage between one or more school districts.

> In Carbon County, Wyoming, under E.S.E.A., Title III, a telephone communications system was included to serve ten public school districts and one private school. The Center is equipped with receiving and transmitting units for an electro-writer---a remote blackboard system. Each of the schools will be equipped with receiving units linked to the center. The electro-writer is used for guest lecture series, classroom lectures, and extension courses for teachers from the University. Approximately 4,100 students are being served by the Project.
>
> Another Title III Project which uses a telephone communications system as part of its

---

[7]S. M. Brown, The Instructor, 78:126, October, 1968.

[8]Dorothy Brown Carr, Teaching Home Bound Pupils By Telephone In Los Angeles, (Los Angeles, California: University of California, Department of Education, 1965); "Learning By Telephone Intercom," Pennsylvania School Journal, 3:288-9, March, 1963; as reported in Larry W. Hughes, An Investigation of Functional Components of Central Facilities Serving Educational Cooperatives and Intermediate School Districts (Charleston, W.Va.: The Appalachia Educational Laboratory, 1968) p. 5; see also, M. A. Steele, "Tele-Teaching: A New Form of Home and Hospital Instruction", Audio-Visual Instructor, 14:80, November, 1969.

> program is located in Rapid City, South Dakota. The project serves 17 counties (18 school districts, 45,700 students) and offers five program areas from data processing to physical education. The telephone communications system incorporates tele-lecture techniques to provide group and individual conferences. A touch-tone type telephone was installed in each of the 18 school districts to improve communication and make more effective use of time by school personnel.[9]

Adult Education. The tele-lecture method was used to teach an adult class in Hebrew reading and writing in East Lansing and Grand Rapids, Michigan; the two classes were taught simultaneously by a master teacher in Chicago, Illinois, while he instructed, live, a "control" group in Chicago. Each of the "experimental" groups (East Lansing and Grand Rapids) consisted of 20 students while 40 students were enrolled in the "control" group in Chicago. All three groups received identical texts, lesson plans, and materials on Hebrew reading and writing. Each group appeared to be identical in age, sex, and prior knowledge of the Hebrew language and they all agreed to meet one night a week for 10 weeks. An electro-typewriter was used in conjunction with the telephone during this project. The students were evaluated by two methods---achievement tests and audio-tapes---at the conclusion of the project. The results of the evaluation showed "a high similarity in

---

[9]Carbon County Schools, Carbon County (Wyoming) Coordinated Instructional Center, Operational Grant No. P.L. 89-10 under USOE Title III, ESEA, Project No. 66-808-, 1967; Douglas Independent School District No. 3, South Dakota, Planning A Supplementary Educational Center, Planning Grant No. P.L. 89-10 under USOE Title III, ESEA, Project No. 66-2221, 1967; as reported in Hughes, op. cit., p. 7-8.

test results" on the achievement test, oral reading (pronunciation, fluency, and correctness), and sight reading.[10]

Tele-lecture Use in West Virginia

A review of the uses of tele-lecture in the educational systems of West Virginia indicates that the models are similar in network design and objectives as implemented at the National level. Tele-lecture has been used at all levels of education and with various network designs.

Higher Education. The Tele-lecture method has been used in West Virginia to provide learning experiences in graduate education, extension education, and adult education. West Virginia University has used tele-lecture to enrich the learning experiences in its education administration intern program. On April 7, 1966, a tele-lecture network was implemented for the education administration intern program. The network included site locations in Morgantown, St. Marys, Athens, Sutton, West Liberty, and Keyser. A group leader, a resident faculty member of West Virginia University, led the discussions at each location/station. The program was divided into two parts: the first part of the program dealt with an interchange of ideas and discussions relating to: "Innovation: Stimulus To In-Service Education" among all six stations; (2) the second part of the program centered around an address delivered by Dr. Nolan Estes, Deputy Associate Commissioner for Elementary and Secondary Education, USOE, from his office in Washington, D.C. Dr. Estes delivered an address

---

[10] L. Edelman, "Teaching Adults via Tele-Lecture," Adult Leadership, 17:163-4, October, 1968.

entitled "Innovation and Educational Programs;" after Dr. Estes's address, the interns and group leaders held an informal question and answer period with Dr. Estes. The audience was an estimated 125 school administrators, and students enrolled in the Education Administration Leadership Intern Program of the Division of Education, West Virginia University. The project was directed by Dr. Arthur N. Hofstetter, West Virginia University.

Under the leadership of Dr. Lorita D. Jenab, Dean School of Nursing, and Mrs. Gearlean M. Slack, Director of Continuing Nursing Education, School of Nursing, West Virginia University has been supported for two projects in continuing Nursing education.[11]

The Project "Extension of Baccalaureate Nursing Education to Registered Nurses was on a Branch Campus" was designed to share the resources at the main campus of West Virginia University, Morgantown, with a branch campus located in Parkersburg, 125 miles away. The Project has a three-year grant period; as of this date, the following courses have been offered to the branch campus students; Nursing 11-Life Process, Nursing 12-Life Process, and Nursing 18. It is projected that the following courses will be offered during the fall semester of 1970-71, Nursing 111 and Nursing 170. The courses are being taught by tele-lecture; the tele-lecture is being supported by such teach/learning aides as films and tele-

---

[11] Extension of Baccalaureate Nursing Education to Registered Nurses on a Branch Campus, Grant No. D1ONU 00405-C1, HEW, Public Health Service, Bureau of Health Professions and Manpower Training; Development of Tele-Lecture and Associate Media System for the Improvement of Nursing Education in West Virginia, HEW, Public Health Service, Division of Nursing, Grant No. 1 D1ONU 00431-01, G.N. Slack, Director.

vision tapes. The television tapes are prepared on the main campus and viewed by the students at the Parkersburg branch.

The Project "Development of Tele-Lecture and Associate Media Systems for the Improvement of Nursing Education in West Virginia." is in the initial implementation stage. It is being proposed that the tele-lecture programs in continuing nursing education will be centered around the following themes: (1) Nursing Education (nutrition, the nursing assessment process, nursing and the law, current and new drug therapy, etc.), (2) Nursing Service (leadership, management principles, in-service education programs), (3) Public Health, and (4) Clinical (public health nursing, psychiatric nursing, coronary care etc.). The tele-lecture program will be supported by such teaching/learning aids as: study guides, bibliographies, reprints, audio and television tapes, and visuals. Initially, 80 hospitals have indicated that they would be interested in being part of the state-wide tele-lecture network directed from West Virginia University. The network will make an attempt to connect all areas of West Virginia into a single health communications system. Considerations are being given to broadening the nature and scope of the Project to include pharmacists, doctors, public health nurses, and other representatives from allied medical fields into the network. The emphasis of the Project is to develop specific programs designed around identifiable local needs and objectives.

During the academic year 1968-69, an extension class in "Modern Mathematics for Elementary Teachers" was offered to the elementary teachers of Randolph County by West Virginia University. The class was taught by

tele-lecture and given under the direction of Dr. Boyd D. Holtan; at the beginning of the course, Dr. Holtan appointed one of the class participants as his coordinator in Elkins, West Virginia, Randolph County (Elkins is approximately 85 miles from the University). The local coordinator's responsibilities were to: (1) distribute all printed handouts, (2) distribute and return all quizes, tests, etc., and (3) act as the liaison contact with Dr. Holtan. The tele-lecture model included the electro-writer; it allowed Dr. Holtan to "electronically" communicate with the students in a written form. The class appeared to be successful in meeting Dr. Holtan's course objectives; more importantly, however, it provided a much needed in-service program to teachers in rural Appalachia who were unable, or unwilling, to commute to a university for such a class.

Elementary and Secondary Education. The use of the tele-lecture in elementary and secondary education in West Virginia shows variety in both network design and use. The tele-lecture was used to teach courses in physics (PSSC) and creative writing to pupils in an isolated mountainous region of West Virginia during the academic year 1967-68. The network connected George Washington High School, Charleston, and Pickens High School, Pickens; George Washington High School is located in a metropolitan area housing approximately 1,100 pupils in grades 10 through 12; Pickens High School is a rural isolated high school (approximately 175 miles from Charleston) housing approximately 100 pupils in grades 7 through 12. The physics and creative writing courses were taught to the pupils in George Washington High School and Pickens High School simultaneously;

that is, as the physics instructor at George Washington High School taught his class in Charleston, he was electronically connected to the pupils at Pickens High School with an electro-writer and tele-lecture equipment. The same procedure was followed in the creative writing classes. Each class (physics and creative writing) at Pickens High School was monitored by a local faculty member; this allowed for professional monitoring of the classroom during lecture, laboratory discussion, and writing phases of the courses. In order to become personally acquainted, the pupils at Pickens High School made a trip to George Washington High School to meet their "instructor" and fellow class members. Thus, through the use of the tele-lecture, in combination with the electro-writer, pupils in a rural isolated high school were given the opportunity to experience an advanced class in two subject areas. "A net achievement in both the subject areas of physics and creative writing was observed by students receiving instruction via tele-lecture. Seven Pickens students received credit for completion of the physics course, and 15 for the creative writing course."[12]

In order to provide equal learning opportunities and to more effectively utilize their professional staff, the Randolph County Schools constructed a tele-lecture network among five high schools during the academic year 1968-69. The high schools which formed the intra-school system tele-lecture network included Pickens, Coalton, Elkins, Harmon, and Tygarts Valley; in addition to the tele-lecture, the schools were intra-connected

---

[12]Appalachia Educational Laboratory, Request for Continued Funding (Charleston, West Virginia: Appalachia Educational Laboratory, First Draft: July 24, 1968) p. 46.

with an electro-writer network. Four subject matter areas were instructed through the network, they were: Algebra II, Biology, Chemistry and French. The procedures utilized within the network and design called for a class to be instructed at a specific high school and simultaneously transmitted to one or more high schools within the system. In practice, the following sub-networks were established: the Chemistry class originated at Elkins High School and was transmitted to Harmon, Tygarts Valley and Coalton; the Algebra II class originated at Coalton and was transmitted to Harmon, Pickens, and Tygarts Valley; the Biology class originated at Pickens and was transmitted to Elkins and Tygarts Valley; and the French class originated at Elkins and was transmitted to Pickens and Tygarts Valley. Through the use of the tele-lecture and the electro-writer, the Randolph County Schools were able to share their most experienced and knowledgeable teachers among the five high schools and, further, provided pupil learning experiences where none had existed before.

The tele-lecture was used to stimulate pupils in their study of the western hemisphere during a sixth grade social studies class. Under the sponsorship and leadership of the Region VI, E.S.E.A., Title III, PACE Center, David E. White, Director, two tele-lecture programs were initiated. One program was between sixth grade pupils in a school in Wood County and their educational counter-parts in Mexico; a second program was between the sixth grade pupils in a school in Wood County and their educational counter-parts in Canada. This learning experience provided pupils with a communications system among three countries in the western hemisphere;

it was a uniquely rewarding experience for all pupils concerned.[13]

The tele-lecture was used to bring expert opinion to a teacher in-service workshop in Harrison County. Two national educational leaders, Dr. James Hymes, Chairman of the Department of Education at the University of Maryland, and Dr. Gertrude Whipple of the Detroit Public Schools, delivered tele-lectures to the Harrison County, E.S.E.A., Title I, In-Service Workshop, June, 1968. Dr. Hymes lectured on preschool learning activities and Dr. Whipple lectured on language arts. Drs. Hymes and Whipple lectured from their offices in Maryland and Detroit, respectively, at two different periods during the day; the Harrison County teachers were given the opportunity, in a question and answer period following the lectures, to communicate directly with national leaders in their respective fields.[14]

A project has recently been funded which creates a tele-lecture network among 11 county school systems in West Virginia.[15] The 11 county school systems to be linked within the network are Barbour, Doddridge, Harrison, Lewis, Marion, Monongalia, Preston, Randolph, Taylor, Tucker, and Upshur. The central or originating point for the network is located in Morgantown, Monongalia County. It is proposed that the network will provide for: (1) inter-communications among the professional staffs of

---

[13]Center for Creative Educational Advancement (Parkersburg, West Virginia, USOE, E.S.E.A., Title III, Project No. 1546), p. 30.

[14]David A. Puzzuoli, Evaluation of the Harrison County E.S.E.A., Title I Project (Morgantown, West Virginia: West Virginia University, 1968) p. 6.

[15]Planning for Regional Cooperation, (Morgantown, West Virginia, USOE, E.S.E.A., Title V, Flo-Through, Project No. 170,) Donald H. Caudill, Director.

the 11 county school systems, (2) inter-communications among the 11 county school boards, (3) a communications linkage between the 11 county school systems and the E.S.e.A., Title III, PACE Center serving the Region, and (4) a communications linkage which affords the opportunity for extension classes in-service programs to be offered to the professional staffs/school board members of the Region. The amplifying units installed in this project are such that they are designed to overcome the natural environmental constrictions in communications which occurs over 5,000 square miles of rugged mountainous territory.

Adult Education. The use of the tele-lecture has been used extensively in adult education in West Virginia. The tele-lecture has been used as a communications linkage between state legislators and their constituency during legislative sessions. Under the leadership of Mr. D. A. Hutchison, County Extension Agent in Marshall County, a tele-lecture between the Marshall County legislators and the citizens of Marshall County was implemented. During the regular session of the legislature, the representatives would report back to the citizens on status of bills, legislation which was being proposed, and other matters relating to legislation. This allowed the citizens of Marshall County to receive first-hand information from their legislatures and provide a question and answer session which provided the legislators with a method to receive "feed-back" from their constituencies.

Another method in which the tele-lecture was used to provide con-

temporary information to citizens was the following. David A. Puzzuoli prepared a 12-minute television tape relating to educational technology and the schools. The television tape was then delivered to Union, W. Va., approximately 225 miles from Morgantown, West Virginia, for viewing. The television tape provided the viewers with information and displays relating to contemporary "Educational Technology;" the audience for the tele-lecture was the professional staff and the Citizens for Better Schools Committee of Monroe County. The audience viewed the television tape and following this viewing an address was presented by D. A. Puzzuoli from his office in Morgantown. Following the television presentation and the tele-lecture, the audience and the speaker inter-acted through a question and answer period.

Summary of the Review of Literature

The many and varied uses of the tele-lecture, and the subsequent use of supporting aids, indicate that a real growth in the use of this "tool" has occurred since professor James A. Burkhart pioneered the use of the telephone in education at Stevens College in 1957.[16]

Professor Burkhart wanted outstanding persons to talk to his class but found that he was constricted by budget and time requirements necessary for persons of distinction to travel from their offices to Stevens College. Through the use of the telephone, Professor Burkhart was able to have such distinguished persons as Senator Robert Taft, Harold Stassin, Orville Faubus, John M. Dalton, Norman Cousins, Democratic and Republic National Committee

---

[16]G. A. Yeomans and H. C. Lindsey, "Tele-Lectures," Speech Teacher, 18:65-7, January, 1969.

Chairmen, State Labor and Business leaders, and Women Leaders in State Politics speak to his class at Stevens College.

The literature reported descriptive studies showing networking, topics under discussion, kinds of audiences, and uses for tele-lecture. It was found that tele-lecture was used to enrich audience knowledge, provide a communications network, teach formal classes, supplement classroom resources, share professional talent, and increase the impact and range of professional expertise. Further, it was found that the tele-lecture was supplemented through the use of audio-tapes, television tapes, 8mm and 16mm films, 35mm slides, over-head projectuals, electro-writers, electro-typewriters, 2" x 2" slides, printed hand-outs, texts, and journal reprints.

However, there appeared to be an absence of research studies relating to the tele-lecture. After more than a decade of formal reporting on the topic, there are real questions which need to be answered. Studies need to be made which find answers to such questions as: Which subject matter areas are best taught through the tele-lecture method?; What is the best mix---tele-lecture and supporting audio-visuals, networking and audience size---for a tele-lecture program?; How can the tele-lecture be most effectively utilized to: provide formal class-works, enrich a class, share professional talent, etc?; What is the most effective management system for 'institutionalizing' a tele-lecture network?

The time has come to initiate research studies on the above and related questions. The remainder of this paper describes an initial step by the Center for Appalachian Studies and Development, West Virginia University, to collect data on the use of tele-lecture in teaching university extension classes.

DESCRIPTION OF THE STUDY

In a simplistic form, education may be considered as a three component structure with the components being: (1) a body of knowledge, (2) a delivery system, and (3) a client (student). The interactions and directional attitudes of the components are such that a student may initiate action towards the delivery system and into the body of knowledge (individualized instruction) or the body of knowledge may be processed through the delivery system towards the student (mediated instruction); further, education may occur within a framework of varying degrees of individualized and mediated instruction.

Institutionalized education (schools) can be defined as the delivery system for formal education. It is within this delivery system, one discovers such elements as teachers, textbooks, films, computer assisted instruction, and other elements society deems as necessary to convey a body of knowledge to a student. This study is predicated on the concept that tele-lecture is a delivery system for conveying knowledge to a client. Further, it is being assumed that the tele-lecture is a teacher mediated delivery system.

As given in previous sections of this report, the tele-lecture is a technique which allows institutions of higher education to broaden their range of influence with a greater degree of economy in resources as measured against the traditional delivery system (professors and students within the same physical environment). The tele-lecture delivers education to wherever the institution finds the students.

Dr. Hugh F. McKean, Chancellor and Chairman of the Board, Rollins College, has stated:

There is one aspect to the lag in education which is particularly difficult to understand. We educators are largely responsible for it. The world rightfully looks to us for leadership in meeting its educational needs and we confine ourselves to the narrow limits of an ancient formula requiring the students to come to us even though we know this kind of education can reach only a very few of those who want and need to learn. We spend billions of tax dollars on "public higher education" which serves a small fragment of the public.

We dream and talk nostaligically of that teacher on the end of the log and that student on the other end. This, we proclaim, is the "ideal situation," the one we should try to emulate. And yet, we know it would be difficult even to provide a log for everyone who wants to learn today, and that to provide a log with a tutor on it would be out of the question.

> ...but there is another kind (delivery system) which could place education on all levels within reach of practically everyone. It would cost relatively little because it would use modern communication techniques...to send the teacher to the student.[17]

Purpose of the Study

The purpose of this study was to collect data on the applicability of teaching university extension classes with tele-lecture as the delivery system. The literature appeared to report a minimum of research studies relating to the implementation of tele-lecture models. More specifically, the literature appeared to report a minimum of data on the effect of tele-lecture on student achievement, student perception of the tele-lecture as a delivery system, and model elements of tele-lecture which increase its efficiency and effectiveness.

---

[17]H. F. McKean, "School for Everyone," Educational Media, 1:8-9, October, 1969.

Limitation of the Study

This study was limited to the evaluation of the tele-lecture as a delivery system in teaching university extension classes. There was no attempt to evaluate the professor, course objectives, and/or subject matter being taught by tele-lecture.

Statement of the Problem

The problem was to determine, through a normative and analytical survey, relevant model elements for teaching university extension courses by tele-lecture.

Objectives

The normative survey phase of this study included three objectives. They were:

1. To determine student opinions towards the tele-lecture as it related to: professor-student interaction and student-student interaction.

2. To determine student opinions toward the tele-lecture as it related to professor lecture time.

3. To determine student opinions toward the tele-lecture as it related to supplemental teaching aids in a tele-lecture model.

Hypotheses

The analytical survey phase of this study was conducted to test two null hypotheses. The null hypotheses were:

1. There is no significant difference in achievement between students who have been instructed by tele-lecture and students who have experienced on-campus instruction.

2. There is no significant difference in student opinion between students who have experienced two different tele-lecture models incoporating different model elements.

Definition of Terms

Education 308 (Ed 308). Education 308, "Modern Mathematics for Elementary Teachers," is a graduate level course designed to provide the student with knowledges in materials and methods of instruction for modern mathematics programs in elementary schools.

Mining Engineering 224 (ME 224). Mining Engineering 224, "Mining Engineering Problems," is a graduate level course designed to provide the student with knowledges in mining engineering relating to coal mining or mineral mining. Further, the course is designed to assist the student in investigating special problems in mining engineering.

Dedicated Line. A dedicated line is a long-distance telephone line reserved on a 24 hours, 7 days per week, basis for the exclusive use of a specific tele-lecture program.

Open Line. An open line is a normal long-distance telephone line used for a tele-lecture program.

Normative Survey. The normative survey is a survey or census to establish a norm or base line from which trends could be discerned or which might be used as a basis for judging some aspect or quality in relation to a sample or population.

Analytic Survey. The analytic survey is similar to the normative survey in that data are obtained regarding some aspect or quality of a sample or population. It differs in that there may be some measuring device employed to discern possible relationships between parameters. It should be noted that analytic surveys do not discern casual relationships; they do identify casual factors that can be studied subsequently through experimentation.

On-Campus. An on-campus course is a course for which a student travels to an institution of higher education to gain certain knowledges by interacting with the professor in a normal classroom environment.

Electro-writer. An electro-writer is an electronic instrument which transmits a written message from a terminal or originating point to a receiving station. At the receiving station, the "written" message is projected onto a screen for viewing.

METHODS, PROCEDURES, AND PRESENTATION OF DATA

Mining Engineering 224

During the first semester of the academic year 1969-70, West Virginia University offered an extension class in Mining Engineering (ME 224); the class was taught by tele-lecture. The tele-lecture originated from the main campus of West Virginia University, Morgantown, West Virginia, and was received in Beckley, West Virginia, approximately 265 miles away. The students received the tele-lecture in a classroom of the Raleigh County Vocation School and the class was given over a period of 15 weeks on Monday evenings, 7:00-10:00 p.m. As the professor delivered the tele-lecture to the students in Beckley, he simultaneously taught four full-time graduate students in the originating studio.

Class Membership. The ME 224 tele-lecture was received by 15 students in Beckley; all of the students were full-time employees of the Mining Industry and held supervisory and/or management positions, i.e., Mine Foreman, Mine Superintendent, and/or Mining Engineer. A majority of the students resided within a 30 mile radius of Beckley; however, one student traveled approximately 110 miles (one-way) to attend the class; all of the students were males.

Model Elements. The tele-lecture was delivered over an open line of the Wide Area Telephone Service (WATS) of West Virginia University and the receiving classroom was equipped with an amplification system implementing two 12 in. loud speakers; in addition to the amplification system, the receiving classroom was equipped with two micro-

phones which allowed the students to communicate with the professor. The tele-lecture incorporated the use of an electro-writer to allow the professor to communicate by written form to the students; the transmitted message on the electro-writer was projected on a 6' x 6' screen to allow maximum viewing. The class was monitored by a technician in Beckley; the technician's responsibilities were to: (1) monitor the electronic system and keep it in working order, and (2) act as the liaison agent between the on-campus professor and the class. In addition to the tele-lecture and the electro-writer, the professor mailed reprints and/or mimeographed materials to the technician for subsequent dissemination to the ME 224 students, on a weekly basis. Further, the professor made three "live" appearances to the class; the purposes of the visits were to: (1) establish rapport between the students and the professor, (2) provide "live" explanations to class problems faced by the students, and (3) explain up-coming tele-lectures. The class did not have a formally adopted textbook; however, the reprints and mimeographed materials were to be placed by the students into a three-ringed notebook which took the place of a formally adopted textbook.

Questionnaire Results (ME 224)

Displayed as Appendix A is a copy of the questionnaire administered to the students enrolled in ME 224; the questionnaire was distributed and retrieved during the final class meeting (December 17, 1969).

The questionnaire was divided into three parts; Part A attempted to retrieve student opinion relating to the effectiveness of the tele-lecture in university extension classes; Part B attempted to retrieve

TABLE I

SUMMARY OF RESPONSES TO THE
TELE-LECTURE QUESTIONNAIRE, M. E. 224, PART A

Statement	Frequency of Response				
	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1. The Tele-lecture Method allows student-professor interaction to occur in the classroom.	1	5	3	5	--
2. The Tele-lecture Method allows student-student interaction to occur in the classroom.	1	4	1	8	1
3. The electro-writer functions as effectively as the professor at the blackboard in its use as an instructional tool.	2	2	1	3	7
4. The classroom atmosphere, under the Tele-lecture Method, is comparable to the classroom atmosphere under a "live" professor.	3	1	1	7	3
5. I could have learned as much by reading some books.	--	1	3	5	6
6. The Tele-lecture Method permits individual student conferences with the professor to occur.	1	8	1	4	1

student opinion relating to tele-lecture model elements; Part C was an open-ended statement which asked the students to provide, in their opinion, the advantages and disadvantages of teaching university extension classes by tele-lecture.

Table I presents a summary of responses of the ME 224 students to Part A of the questionnaire. Only 6 students agreed with the statement "the tele-lecture method allows student-professor interaction to occur in the classroom." Five students disagreed with this statement and three students were undecided.

Nine of the fifteen students responding to statement No. 2 disagreed with "the tele-lecture method allows student-student interaction to occur in the classroom." Only five of the fifteen respondents agreed with this statement and one student was undecided.

Ten of the fifteen students disagreed with the statement "the electro-writer functions as effectively as the professor at the blackboard in its use as an instructional tool." One student was undecided and four students agreed with the statement.

Ten students disagreed with the statement "the classroom atmosphere, under the tele-lecture method, is comparable to the classroom atmosphere under a live professor." Four students agreed with this statement and one student was undecided.

Eleven students of the fifteen responding to "I could have learned as much by reading some books," disagreed. Only one student agreed with this statement while three students were undecided.

Nine students agreed with the statement "the tele-lecture method permits individual student conferences with the professor to occur."

Five of the fifteen students disagreed with this statement and one student was undecided.

TABLE II

SUMMARY OF RESPONSES TO THE TELE-LECTURE QUESTIONNAIRE, M.E. 224, PART B, STATEMENTS 1-4

		Frequency of Response		
		Yes	Undecided	No
1.	I would enroll in another tele-lecture course.	7	6	2
2.	For optimal use, the classroom should be acoustically compatible with a Tele-lecture course.	12	2	1
3.	For optimal student interaction in a Tele-lecture course, the classroom should be supplied with an electronic system which allows easy voice contact to the professor by the student.	15	--	--
4.	The Tele-lecture Method would be more effective if it incorporated more and varied components.	15	--	--

Table II presents a summary of the responses of ME 224 students to Part B of the questionnaire. It can be observed that seven of the respondents would enroll in another tele-lecture course and two of the respondents would not enroll in another tele-lecture course. Six of the students were undecided about enrolling in another tele-lecture course.

Twelve of the fifteen students responded in the affirmative that the classroom should be acoustically compatible with the tele-lecture course.

Only one student responded negatively to this statement while two students were undecided.

The total class, 15 students, answered in the affirmative that "for optimal student interaction in a tele-lecture course, the classroom should be supplied with an electronic system which allows easy voice contact to the professor by the student."

The total class, 15 students, agreed to the statement "the tele-lecture method would be more effective if it incorporated more and varied components."

In referring to the questionnaire in Appendix A, the reader may observe that statement B-5 requested the respondents to indicate their preference of one or more components which could be incorporated into a tele-lecture course to increase its effectiveness. The responses to statement B-5 indicate that thirteen of the fifteen students would recommend that the professor "provide a number of handouts and/or other printed materials to the students relating to the professor's lecture." In addition, eleven of the fifteen students recommended that the professor "make an appropriate number of personal visits to the class." Five of the students recommended the use of video-tapes in presenting selected elements of a tele-lecture course and six of the respondents recommended that an extensive use of audio-visual materials, i.e., films, slides, etc. be incorporated in a tele-lecture course.

Statement B-6 in the questionnaire requested the respondents to react to an "optimal" time for continuous lecturing on the tele-lecture system as related to holding student interest by the professor. Table

III presents a summary of the responses to statement B-6 by the ME 224 students. It can be observed that twelve of the fifteen students recommended that the length of continuous tele-lecturing be less than 64 minutes.

TABLE III

SUMMARY OF RESPONSES TO OPTIMAL TIME FOR TELE-LECTURE, ME 224

	Option	Frequency
a.	20-24 minutes	1
b.	25-44 minutes	4
c.	45-64 minutes	7
d.	65-84 minutes	2
e.	85-104 minutes	1
f.	Other	--

Part C of the questionnaire requested the respondents to discuss or list the advantages and/or disadvantages of the tele-lecture method versus the standard procedure utilized in teaching extension classes. The following quotations are given as received from the ME 224 students.

> It is not easy to stop a professor in his lecture to question him, consequently, one may miss something...it is too easy for the instructor to digress and move back and forth on subject matter.
>
> Writing is not plain when writing is small (on the electro-writer).
>
> The student should have a printed lesson to go by as it is explained on the board (on the electro-writer).

The method is providing material for people who could not otherwise avail themselves in any other manner...

No advantages except availability...the professor cannot see student reactions to statements...not enough opportunity to clarify questions, problems, etc.

The greatest disadvantage is the lack of discussion facilities. I think a room with larger tables, 4-6 students to the table or a group with one or two microphones per table would be a great improvement...one distinct advantage is that students can see problems worked step by step---without even the instructor blocking the view---and he can be speaking so they hear distinctly as well.

Lack of contact, (personal), with instructor... the equipment used in this class was poor. Better equipment at the start of the class would have made a better impression...this method is better than no instruction at all.

The tele-lecture method offers an opportunity to the university to reach many people. It has many "bugs" but with time these may be corrected. The student must learn a new method for being instructed (author's emphasis). The relationship between professor and student is almost lost. I did not realize how important this was.

The three-hour periods are too long for this method...the electro-writer leaves a lot to be desired in clarity.

The instructor must speak slowly and distinctly and not allow his voice to lower in volume when ending sentences.

The room acoustics are very poor...students have difficulty in talking to the professor... the lecture frequently is hard to understand. This is a poor method for two-way communication. The advantage to this method is that I can go to class at home.

Summary of ME 224 Responses

Responses to Part A. The data collected in Part A of the questionnaire from the students in ME 224 appears to indicate that: (1) the tele-lecture, as implemented in this phase of the study, did not allow student-professor or student-student interaction to occur, (2) the electro-writer did not function as effectively as a professor at a blackboard in a normal classroom, (3) the students did not believe that the classroom atmosphere under the tele-lecture was comparable to a "live" professor in a classroom atmosphere, (4) the students appeared to indicate that they gained more knowledge through the use of the tele-lecture than they could gain by reading some books, and (5) the tele-lecture method permits individual student conferences with the professor.

Responses to Part B. The responses retrieved through Part B of the questionnaire appeared to indicate that the students enrolled in ME 224: (1) would enroll in another tele-lecture course, (2) believe that the receiving station should be acoustically designed for tele-lecture and the system should be designed to allow easy voice contact to the professor by the student, and (3) the tele-lecture would be more effective if it incorporated more and varied components. The ME 224 students indicated that the tele-lecture, in conjunction with the electro-writer, would be more effective if it was supplemented by printed materials relating to the lecture, personal visits to the classroom by the professor, use of videotapes, and an extensive use of audio-visual materials. Further, the ME 224 students indicated that continuous lecturing by the professor on the system should not

exceed 45 to 64 minutes.

Responses to Part C. The written responses received through Part C on the questionnaire appeared to support the data retrieved through Parts A and B. The ME 224 students appeared to be indicating that the electronic equipment should be of high quality and in excellent condition in order to properly convey both the audio and "writing" portions of the tele-lecture; further, the students appeared to be indicating that the professor should speak with loud and distinct tonal qualities and use large bold strokes when writing on the electro-writer. It was found that students recognized the tele-lecture as an impersonal teaching method in that the normal professor and student relationship is lost; more astutely, the students recognized that the tele-lecture is a method of increasing the impact and expertise residing within a university. One student appeared to be exceptionally observant in his analysis of the use of the tele-lecture in teaching university extension classes when it was stated: "the student must learn a new method for being instructed."

Generally speaking, it appeared that the students participating in ME 224 have indicated that the tele-lecture method does have a place in extension education. It appears that the students implied that a university should make a determined review of the tele-lecture method before arbitrarily implementing tele-lecture courses.

The students appeared to indicate that the tele-lecture professor must present a well-planned course of instruction. The course should be designed such that it does not rely solely upon the lecture method in the implementation of a tele-lecture course; a tele-lecture should be imple-

mented with extensive use of related model elements---printed handouts, audio-visual materials, video-tapes, and personal classroom visits.

Education 308: Tele-lecture

During the second semester of the academic year 1969-70, West Virginia University offered an extension class in modern mathematics for elementary teachers (Ed. 308); the class was taught by tele-lecture. The tele-lecture originated from the main campus of West Virginia University, Morgantown, West Virginia, and was received in Beckley, West Virginia, approximately 265 miles away. The students received the tele-lecture in a classroom of the Raleigh County Vocation School and the class was given over a period of 15 weeks on Monday evenings, 7:00-10:00 p.m.

Class Membership. The Ed. 308 tele-lecture was received by 13 students in Beckley; all of the students were elementary teachers employed by public schools in West Virginia. A majority of the students resided within a 30 mile radius of Beckley with the class being approximately 40 per cent male and 60 per cent female.

Model Elements. The tele-lecture was delivered over an open line of the Wide Area Telephone Service (WATS) of West Virginia University and the receiving classroom was equipped with an amplification system implementing two 12-inch loud speakers; in addition to the amplification system the receiving classroom was equipped with two microphones which allowed the students to communicate with the professor. The tele-lecture incorporated the use of the electro-writer to allow the professor to communicate by written form to the students; the transmitted message on the electro-writer was projected on a 6' x 6' screen

to allow maximum viewing. The class was monitored by a technician in Beckley; the technician's responsibilities were to: (1) monitor the electronic system and keep it in working order, and (2) act as the liaison agent between the on-campus professor and the class. In addition to the tele-lecture and the electro-writer, the professor distributed (1) weekly quizes, (2) programed self-instruction materials, (3) reprints, (4) assignments, and (5) mimeographed self-learning activities to the technician for subsequent dissemination to the Ed. 308 students. Further, the professor made two "live" appearances to the class; the first appearance was during the initial meeting of the class for purposes of presenting the course objectives, guidelines, and general rapport; the second appearance was made during the final class meeting to administer a final examination to the students. The class had a formally adopted textbook.

Questionnaire Results (Ed. 308)

Intervening Variable. This author made a preliminary examination of the data collected from the questionnaire administered to the ME 224 students at the end of the first semester, 1969-70. Prior to the beginning of the Ed. 308 class, this author and the professor conducting the Ed. 308 class held three meetings. The purposes of the meetings were: (1) review the data collected from the ME 224 tele-lecture, (2) determine if the ME 224 data had implications for the Ed. 308 tele-lecture, (3) incorporate model elements into the Ed. 308 tele-lecture which appeared appropriate after a thorough review of the ME 224 data. As a result of the ME 224 data, the following adjustments were proposed and implemented in the Ed. 308 tele-lecture: (1) continuous lecturing on the tele-lecture would

be reduced from an average of approximately 60 minutes to an average of 20-25 minutes, (2) a greater number of self-instruction materials would be incorporated, (3) a greater number of printed materials which would assist in developing professor-student and student-student interaction would be incorporated, and (4) the electro-writer would be used as a device for problem-solving as opposed to a device to only communicate facts.

The identical questionnaire administered to the ME 224 students was administered to the Ed. 308 students during the final class meeting (May 4, 1970), see Appendix A.

Table IV presents a summary of responses of the Ed. 308 students to Part A of the questionnaire. All 13 students agreed with the statement "The tele-lecture method allows student-professor interaction to occur in the classroom."

The total sample, 13 students, agreed with the statement, "The tele-lecture method allows student-student interaction to occur in the classroom."

Twelve of the 13 students agreed with the statement "The electro-writer functions as effectively as the professor at the black board in its use as an instructional tool." Only one student disagreed with this statement.

Five of the 13 students agreed with the statement "The classroom atmosphere, under the tele-lecture method, is comparable to the classroom atmosphere under a live professor." Four students disagreed with this statement and four students were undecided.

The total sample, of 13 students, disagreed with the statement "I

TABLE IV

SUMMARY OF RESPONSES TO THE
TELE-LECTURE QUESTIONNAIRE, ED. 308, PART A

Statement	Frequency of Response				
	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1. The Tele-lecture Method allows student-professor interaction to occur in the classroom.	6	7	-	-	-
2. The Tele-lecture Method allows student-student interaction to occur in the classroom.	8	5	-	-	-
3. The electro-writer functions as effectively as the professor at the blackboard in its use as an instructional tool.	2	10	-	1	-
4. The classroom atmosphere, under the Tele-lecture Method, is comparable to the classroom atmosphere under a "live" professor.	3	2	4	4	-
5. I could have learned as much by reading some books.	-	-	-	6	7
6. The Tele-lecture Method permits individual student conferences with the professor to occur.	2	7	4	-	-

could have learned as much by reading some books."

Nine of the 13 students agreed with the statement "The tele-lecture method permits individual student conferences with the professor to occur." No students disagreed with this statement; however, four students were undecided.

TABLE V

SUMMARY OF RESPONSES TO THE TELE-LECTURE QUESTIONNAIRE, ED. 308, PART B, STATEMENTS 1-4

		Frequency of Response		
		Yes	Undecided	No
1.	I would enroll in another Tele-lecture course.	13	-	-
2.	For optimal use, the classroom should be acoustically compatible with a Tele-lecture course.	9	3	1
3.	For optimal student interaction in a Tele-lecture course, the classroom should be supplied with an electronic system which allows easy voice contact to the professor by the student.	12	1	-
4.	The Tele-lecture Method would be more effective if it incorporated more and varied components.	10	-	3

Table V presents a summary of the responses of Ed. 308 students to Part B of the questionnaire. It can be observed that the total sample, 13 students, would enroll in a tele-lecture course.

Nine of the 13 students responded in the affirmative that the classroom should be acoustically compatible with the tele-lecture course.

Three students responded that they were undecided.

Twelve of the 13 students answered in the affirmative that "For optimal student interaction in a tele-lecture course, the classroom should be supplied with an electronic system which allows easy voice contact to the professor by the student." Only one student was undecided in his response to this statement.

Ten of the 13 students agreed with the statement "The Tele-lecture method would be more effective if it incorporated more and varied components." Three students gave a negative response to this statement.

In referring to the questionnaire in Appendix A, the reader may observe that statement B-5 requested the respondents to indicate their preference of one or more components which could be incorporated into a tele-lecture course to increase its effectiveness. The responses to statement B-5 indicate that 11 of the 13 students would recommend that the professor "Provide a number of handouts and/or other printed materials to the students relating to the professor's lecture." In addition, five of the 13 students recommended that the professor "make an appropriate number of personal visits to the class." The students further recommended the use of video-tapes in presenting selected elements of a tele-lecture course and an extensive use of audio-visual materials, i.e., films, slides, etc. be incorporated in a tele-lecture course.

Statement B-6 in the questionnaire requested the respondents to react to an "optimal" time for continuous lecturing on the tele-lecture system as related to holding student interest by the professor. Table VI presents a summary of the responses to statement B-6 by the Ed. 308 students. It can be observed that 11 of the 13 students recommended

that the length of continuous tele-lecturing be less than 44 minutes.

TABLE VI

SUMMARY OF RESPONSES TO OPTIMAL TIME
FOR TELE-LECTURE, ED. 308

Option	Frequency
20-24 minutes	3
25-44 minutes	8
45-64 minutes	2
65-84 minutes	-
85-104 minutes	-
Other	-

Part C of the questionnaire requested the respondents to discuss or list the advantages and/or disadvantages of the tele-lecture method versus the standard procedure utilized in teaching extension classes. The following quotations are given as received from the Ed. 308 students.

> The class is very informal...there was no time off from classes because of bad weather, which frequently occurs in Beckley...
>
> An advantage of the tele-lecture is that student interest was aroused by the use of new teaching methods which possibly lends to a better learning situation...
>
> An advantage (of the tele-lecture) would be the services of a master instructor who would be unable to teach in a regular (extension) situation...
>
> A microphone for each student would be of help.
>
> The tele-lecture classes usually have teachers from the university that are qualified to teach

the extension course which is being offered where (a normal) extension class may not have this advantage at all times.. it is not like a TV class...you do have voice communication.

The tele-lecture is not very different from having a "live" professor...it is easier to get the professor's attention by using a microphone than in a normal classroom. It is easier to hear (the professor) because of the dual speaker system which gives equal volume of sound to the whole classroom...the electro-writer is really better than a chalkboard because the transparency can be rotated easier than chalk can be erased...Really, there is more constructive student-student interaction in this type of course than in an actual classroom.

Two microphones are not enough...there is some interference from time to time on the lines which cause (student)con-fusion.

(The advantage of the tele-lecture) is that better relations among the students exists... the classroom atmosphere is more relaxing... the professor at the university is more able to help us in getting information from the university.

If (the tele-lecture class) was large, it would be somewhat difficult to have dis-cussions and conferences between students and professors during the regular class period.

This type of class encourages students to solve problems or discover solutions to problems on his own...

...the students discuss subject matter with each other more, which gives the teacher time to discuss major problems.

Summary of Ed. 308 Responses

Responses to Part A. The data collected in Part A of the ques-tionnaire from the Ed. 308 students appears to indicate that: (1) the

tele-lecture, as implemented in this phase of the study, allows student-professor and student-student interaction to occur, (2) the electro-writer functioned as effectively as a professor at a blackboard in a normal classroom, (3) the students were mixed in their responses that the classroom atmosphere under the tele-lecture was comparable to a "live" professor in a classroom, (4) the students indicated that they gained more knowledge through the use of tele-lecture than they could gain by reading some books, and (5) the tele-lecture method permits individual student conferences with the professor.

Responses to Part B. The responses retrieved through Part B of the questionnaire appeared to indicate that the students enrolled in Ed. 308 (1) would enroll in another tele-lecture course, (2) believe that the receiving station should be acoustically designed for tele-lecture, (3) the system should be designed to allow easy voice contact to the professor by the student, and (4) the tele-lecture would be more effective if it incorporated more and varied components. The Ed. 308 students indicated that the tele-lecture, in conjunction with the electro-writer, would be more effective if it was supplemented by printed materials relating to the lecture, personal visits to the classroom by the professor, use of video-tapes, and an extensive use of audio-visual materials. Further, the Ed. 308 students indicated that continuous lecturing by the professor on the system should not exceed 25-44 minutes.

Responses to Part C. The written responses through Part C of the questionnaire appear to support the data retrieved through Parts A and B. The Ed. 308 students appeared to be indicating that the tele-lecture had distinct advantages; these were: (1) the tele-lecture insured the proba-

bility of a high quality instructor for University extension classes, (2) the tele-lecture classroom provided an informal/relaxed atmosphere, (3) the tele-lecture class encouraged students to solve problems or discover solutions to problems through their own efforts, (4) the tele-lecture class allowed constructive student-professor interaction to occur to a greater degree than in a normal classroom, and (5) the electro-writer is an important model element in a tele-lecture program.

Generally speaking, it appeared that the students participating in Ed. 308 have indicated that the tele-lecture method does have a place in extension education. The students appeared to be enthusiastic in their support of the use of tele-lecture in teaching university extension classes.

Education 308: On-Campus

During the first semester of the academic year 1969-70, Ed. 308 was offered as an on-campus course at the Kanawha Valley Graduate Center, West Virginia University. The Ed. 308 on-campus course was under the direction and taught by the same professor who directed and taught the Ed. 308 tele-lecture course.

Class Membership. Forty students were enrolled in Ed. 308 during the first semester, 1969-70, at the Kanawha Valley Graduate Center (KVGC). All of the students enrolled in Ed. 308, KVGC, were employed by public schools in West Virginia. The forty students were divided into two groups of 20 each; one group of students (Group A) was taught through an independent study model which included responsibilities for implementing/solving individual projects/problems; the second group of students (Group B) was taught through the normal teacher-mediated classroom model. It is the second group, teacher-mediated, which is of interest

to this study. This second group of twenty students (Group B) was considered as the control group for testing null hypothesis no. 1, given in a previous section of this report.

On-Campus Teaching. The teaching model implemented for Group B, Ed. 308, KVGC, on-campus course incorporated teacher-lectures, teacher-demonstrations, student responses, and class discussions. The Ed. 308, KVGC, class met one day per week for a period of 15 weeks during the first semester, 1969-70. The Ed. 308, KVGC, class adopted the same basic textbook as was used in Ed. 308, tele-lecture. The Ed. 308, KVGC, students received the identical (1) weekly quizes, (2) program self-instruction materials, (3) reprints, (4) assignments, (5) mimeograph self-learning activities as was distributed to the Ed. 308, tele-lecture, class. In addition, the professor delivered the same lecture materials to Ed. 308, tele-lecture, as given to Ed. 308, on-campus, Group B.

Thus it can be observed that all teaching elements and the professor were identical for Ed. 308, on-campus, and Ed. 308, tele-lecture. However, there was one major and significant difference between the two Ed. 308 courses; this difference resided in the delivery system. The delivery system for the Ed. 308, KVGC, course was the typical on-campus model which deemed that "students would travel to the professor;" the delivery system for the Ed. 308, tele-lecture, course incorporated the use of communications technology which "brought the professor to the student."

Academic Achievement

The professor who directed and instructed Ed. 308, on-campus,

and Ed. 308, tele-lecture, developed an academic achievement instrument. For purposes of this study it shall be titled the Holtan Test of Modern Mathematics; the HTMM is a test of academic achievement and was developed to measure student progress towards the behavioral objectives of Ed. 308, as defined by the mathematics education program area of West Virginia University.

The HTMM was administered to both the on-campus and tele-lecture students in Ed. 308 in a pre-test and post-test design. The results of the administration of the HTMM to both groups of Ed. 308 students are presented in Table VII.

It can be observed that the Ed. 308, KVGC, students achieved a group mean score of 23.70 on the pre-test and a mean group score of 36.25 on the post-test with a subsequent group mean gain score of 12.55. The individual gain scores ranged from 2 to 21.

The Ed. 308, tele-lecture, students achieved a mean pre-test score of 24.31 and a mean post-test score of 43.85 with a subsequent gain score of 19.54 on the HTMM. The individual gain scores ranged from 9 to 35.

TABLE VII

SUMMARY OF PRE-TEST AND POST-TEST SCORES ACHIEVED BY STUDENTS ENROLLED IN ED. 308, TELE-LECTURE, AND ED. 308, KANAWHA VALLEY GRADUATE CENTER

Tele-Lecture				Kanawha Valley Graduate Center			
Subject	Pre-test score	Post-test score	Gain	Subject	Pre-test score	Post-test score	Gain
1	12	31	19	1	17	19	2
2	22	38	16	2	24	36	12
3	29	48	19	3	29	47	18
4	28	44	16	4	19	39	20
5	16	47	31	5	28	38	10
6	28	50	22	6	23	42	19
7	27	46	19	7	30	46	16
8	28	46	18	8	23	27	4
9	15	50	35	9	27	45	18
10	23	33	10	10	32	53	21
11	28	46	18	11	27	29	2
12	40	49	9	12	13	26	13
13	20	42	22	13	20	30	10
				14	34	45	11
				15	32	50	18
				16	15	29	14
				17	17	32	15
				18	21	34	13
				19	26	31	5
				20	17	27	10
Mean	24.31	43.85	19.54		23.70	36.25	12.55
S. D.	7.43	9.28			6.18	6.33	

ANALYSIS OF DATA

This section of the report presents an analysis of the data collected through the student questionnaire administered to students in ME 224 and Ed. 308 tele-lecture and the achievement data for students in Ed. 308, KVGC, and Ed. 308, tele-lecture. The analyzation of the data used statistical techniques conducive to meaningful data interpretation; through the use of sound statistical techniques, a strong basis for analytical procedures is projected.

The Mann-Whitney U Test was used in analyzing the student responses to the questionnaire. The mean, standard deviation, variance, and "t-value" were computed for the Ed. 308, KVGC, HTMM pre-test and post-test results; in addition, these statistics were generated for the Ed. 308, tele-lecture, pre-test and post-test results on the HTMM. Acceptance levels for significance were established at the 0.05 significance level, with preference given to the 0.01 significance level.

Analysis of Student Opinion

Tables I and IV present the responses of students in ME 224 and Ed. 308, respectively, as they relate to the effectiveness of the tele-lecture on selected variables. The tele-lectures of ME 224 and Ed. 308 were implemented by the use of two different models; the Ed. 308 tele-lecture differed from the ME 224 tele-lecture in that: (1) continuous lecturing was reduced from an average of approximately 60 minutes to an average of 20-25 minutes, (2) a greater number and variety of self-instruction materials were incorporated, (3) a greater number and variety of printed materials to assist in developing professor-student and student-student interactions were incorporated, and (4) the electro-

writer was used as a problem-solving instrument.

The Mann-Whitney U Test was applied to the data given in Tables I and IV to test the null hypothesis that "there is no significant difference in student opinion between students who have experienced two different tele-lecture models incorporating different model elements."

The Mann-Whitney U Test was used because the two samples involved in this phase of the study (ME 224 and Ed. 308) did not consist of matched pairs and the data were numerical in nature. The U-test is a powerful non-parametric technique and is frequently employed in place of the parametric t-test with little loss in power efficiency.

> The U-test is based upon the notion that, if scores of two similar groups are ranked together (as though the two groups were one), there will be a considerable intermingling of the two groups' rankings; but if one group significantly exceeds the other, then most of the superior group's rankings will be higher than those of the inferior group... The Mann-Whitney U Test can be used with extremely small samples.[18]

A U-value of 24.5 was calculated through the use of the Mann-Whitney U Test. In order to determine if the U-value of 24.5 was statistically significant, the U-value was translated into a z-value which allowed subsequent interpretation and level of probability of the U-value to be determined through the use of the normal curve; a z-value of 3.36 was calculated. The z-value was found to be significant beyond the 0.01 level of significance; in addition, since the Mann-Whitney U Test is a one-tailed test, the direction of the significance indicates that the

---

[18] W. James Popham, Educational Statistics: Use and Interpretation (New York: Harper and Row, 1967), p. 281.

Ed. 308 students held a significantly more positive opinion on teaching university extension classes by tele-lecture than the ME 224 students.

Thus, the null hypothesis is rejected and in its stead one may accept the hypothesis that there is a significant difference in student opinion between students who have experienced two different tele-lecture models, especially when the tele-lecture model incorporates more and varied supplemental and self-instructional elements, continuous lecturing by the professor is minimized, and the tele-lecture is based on problem-solving techniques.

On-Campus versus Tele-lecture Achievement

Table VIII presents a summary of group mean scores and standard deviations achieved by students in Ed. 308, tele-lecture, and Ed. 308, on-campus, on the Holtan Test of Modern Mathematics. The t-test was applied to these data to determine if "there is no significant difference in achievement between students who have been instructed by tele-lecture and students who have experienced on-campus instruction." With 31 degrees of freedom, the t-values appropriate to this study are 2.04 at the 0.05 level of significance and 2.75 at the 0.01 level of significance.

The choice of t-models and the significance of the t-values one generates are dependent upon three factors; these factors are (1) the presence of correlation between group data, (2) the sample size, and (3) the similarity, or homogeneity, of group variances.

In order to test for similarity, or homogeneity, of group variances, an F-ratio was calculated for the HTMM pre-test variance and the HTMM post-test variance of the Ed. 308, tele-lecture, and Ed. 308, KVGC, students (see Table IX). The calculated F-ratios indicate that

TABLE VIII

SUMMARY OF MEAN SCORES AND STANDARD DEVIATIONS ACHIEVED BY STUDENTS IN ED. 308 AS TAUGHT BY TELE-LECTURE AND ON CAMPUS AT THE KANAWHA VALLEY GRADUATE CENTER

Tele-Lecture					Kanawha Valley Graduate Center				
	Pre-test		Post-test			Pre-test		Post-test	
N	mean	st.dev.	mean	st.dev.	N	mean	st.dev.	mean	st.dev.
13	24.31	7.43	43.85	9.28	20	23.70	6.18	36.25	6.33

TABLE IX

SUMMARY OF t-TEST VALUES BETWEEN PRE-TEST MEANS AND BETWEEN POST-TEST MEANS; SUMMARY OF CRITICAL F-RATIO VALUES FOR PRE-TEST VARIANCES AND FOR POST-TEST VARIANCES: ED. 308 STUDENTS

	Pre-test Mean	Post-test Mean	t-value	Pre-test Variance	Post-test Variance	Critical F-ratio
Tele-lecture	24.31			55.23		
KVGC	23.70		0.23*	38.22		1.45**
Tele-lecture		43.85			86.06	
KVGC		36.25	2.59*		38.64	2.23***

*with 31d.f., $t_{.05}=2.04$; **$F_{12,19,.05}=2.31$; ***$F_{19,12,.05}=2.54$

there was no significant difference found between the group variances achieved by the Ed. 308, tele-lecture, and the Ed. 308, KVGC, students in either the pre-test or the post-test administration of the HTMM. Thus, after correction for the sample size, one can apply a t-test model to the pre-test and post-test group means achieved by the two groups.

A t-value of 0.23 was calculated between the pre-test group means of 24.31 (Ed. 308, tele-lecture) and 23.70 (Ed. 308, KVGC). The t-value of 0.23 was not significant at the 0.05 level of significance. Therefore, it appears that the two groups of students were homogenous during pre-testing, in their knowledge of modern mathematics as measured by the F-ratio and the t-test.

A t-value of 2.59 was calculated between the post-test group means of 43.85 (Ed. 308, tele-lecture) and 36.25 (Ed. 308, KVGC). The calculated t-value of 2.59 was found to be significant at the 0.05 level of significance. Therefore, it can be stated that the post-test group mean achieved by the Ed. 308, tele-lecture, students was significantly greater than the post-test group mean achieved by the Ed. 308, KVGC, students. These data are summarized in Table IX.

The null hypothesis that "there is no significant difference in achievement between students who have been instructed by tele-lecture and students who have experienced on-campus instruction" is rejected. Therefore, it can be assumed, under the conditions of this study, that student achievement in university extension classes taught by tele-lecture is equal to or significantly greater than students who have experienced an on-campus class.

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study was based on the assumption that education may be considered as a three component structure with the components being: (1) a body of knowledge, (2) a delivery system, and (3) a client (student). Further, it was assumed that the interaction and directional attitudes of the components are such that a student may initiate action towards the delivery system and into the body of knowledge (individualized instruction) or the body of knowledge may be processed through the delivery system towards the student (mediated instruction); also, education may occur within a framework of varying degrees of individualized and mediated instruction. Institutionalized education (schools) may be defined as a delivery system for formal education.

The purpose of this study was to collect data on the applicability of teaching university extension classes with tele-lecture as the delivery system. The literature appeared to report a minimum of research studies relating to the implementation of tele-lecture models.

Re-Statement of the Problem. The problem was to determine, through a normative and analytical survey, relevant model elements for teaching university extension courses by tele-lecture.

Collection of Data. All data collected in the study were obtained through the use of instruments constructed by this author and/or Dr. Boyd D. Holtan, Associate Professor of Mathematics Education, West Virginia University. Through the cooperation of the office of Extension Credit and Non-Credit Programs, Coal Research Bureau, and the Mathematics Edu-

cation Program Area of West Virginia University, all data reported herein was made available to the author. The total population of subjects in this study was 48.

Treatment of Data. The data collected on the student questionnaires were tabulated in Frequency Tables for each student on each statement and by forced-choice options; in addition, each response to a forced-choice option was given a numerical value. The responses to the open-ended question were summarized and presented as student opinions.

The responses to the questionnaire forced-choice options were statistically treated by the Mann-Whitney U Test. The group mean scores and group variances achieved by the students on the Holtan Test of Modern Mathematics were treated by the t-test and F-ratio, respectively. The acceptance level at which a difference was ruled significant was the 0.05 level of significance; however, preference was given to the 0.01 level of significance.

Conclusions

Within the limitations of this study and based upon findings of the study, the following conclusions seem warranted:

1. Reject the null hypothesis that there is no significant difference in achievement between students who have been instructed by tele-lecture and students who have experienced on-campus instruction.

This study appears to support the thesis that the achievement of students in university extension classes taught by tele-lecture is equal to or greater than the achievement of students enrolled in an on-campus course.

2. Reject the null hypothesis that there is no significant difference in student opinion between students who have experienced two different tele-lecture models incorporating different model elements.

Through the data collected in this study, it appears that student opinion relating to teaching university extension classes by tele-lecture is dependent upon the use of a number and variety of supplemental elements within the tele-lecture model. The data appear to support the thesis that the success of teaching university extension classes by tele-lecture is greater when the professor: (1) limits continuous lecturing on the system to 20-25 minutes, (2) provides a number and variety of printed materials to the class, (3) utilizes contemporary audio-visual techniques/methods to supplement the class, (4) makes an appropriate number---two or three---of personal visits to the tele-lecture classroom, and (5) bases the class upon the problem-solving technique.

Findings

Based upon the limitations of the study and the data retrieved, it appears that the following findings were generated:

1. A valid normative survey for establishing a norm or base line can be made which will act as an indicator of the quality of extension classes taught by tele-lecture.

2. A valid analytic survey can be made that will discover possible casual relationships between the success of tele-lecture extension classes and student achievement or student opinion.

3. The planning and preparation for teaching university extension classes by tele-lecture is an important component in implementing tele-lecture classes.

4. The active participation in self-learning activities by students is related to the success of teaching university extension classes by tele-lecture.

5. Student opinion of university extension classes taught by tele-lecture may be modified by varying the tele-lecture model elements.

Recommendations

The following recommendations are based upon the data, conclusions, and findings of the study.

1. It is recommended that the Center for Appalachian Studies and Development continue its efforts in research and evaluation of tele-lecture in teaching university extension classes.

The center for Appalachian Studies and Development should continue its efforts in research and evaluation of tele-lecture to assist its decision-makers. Additional research should be implemented to discover those subject areas or disciplines which may be best implemented through the tele-lecture. In addition, the Center should make a concerted research effort toward cost-analysis and efficiency in expenditure of funds as related to teaching extension courses by tele-lecture and "on-campus". Through its research effort, the Center should begin to generate guidelines for implementing tele-lecture extension classes; these guidelines would be of invaluable service to all instructional units within the University. It has become increasingly apparent that the use of tele-lecture in teaching extension classes and conducting workshops or seminars is on the increase; it is only through continuous research and evaluation that the tele-lecture will fulfill its maximum capabilities.

2. It is recommended that the tele-lecture be continued to be used in teaching university extension classes at West Virginia University.

The study appears to support the thesis that the tele-lecture is a viable and appropriate method for teaching university extension classes. However, the author wishes to caution the potential user of tele-lecture to implement it through a model which is based upon the conclusions and findings generated by this study. Implementing an un-planned or loosely designed tele-lecture will result in a poor quality program with a subsequent loss in the total effectiveness of tele-lecture.

3. It is recommended that the Center for Appalachian Studies and Development institute an Office of Tele-lecture Programs.

In order to maximize the efficiency and assure the quality of university extension classes taught by tele-lecture, it is recommended that an Office of Tele-lecture Programs become an organizational program area within the Office of Extension Credit and Non-Credit Programs, Center for Appalachian Studies and Development. The Office of Tele-lecture Programs should contain three units. The proposed units are: Technical Support unit, Research and Evaluation unit, and the Curriculum Materials Development unit; each of these units would have a specific function to insure the probability that a tele-lecture program would be maximized in terms of quality and efficiency (see Figure 1).

Technical Support Unit. The Technical Support unit would house personnel with expertise in the development and production of overhead transparencies, 35mm slides, video-tapes, audio-tapes, and other support elements necessary to supplement a tele-lecture program. The personnel

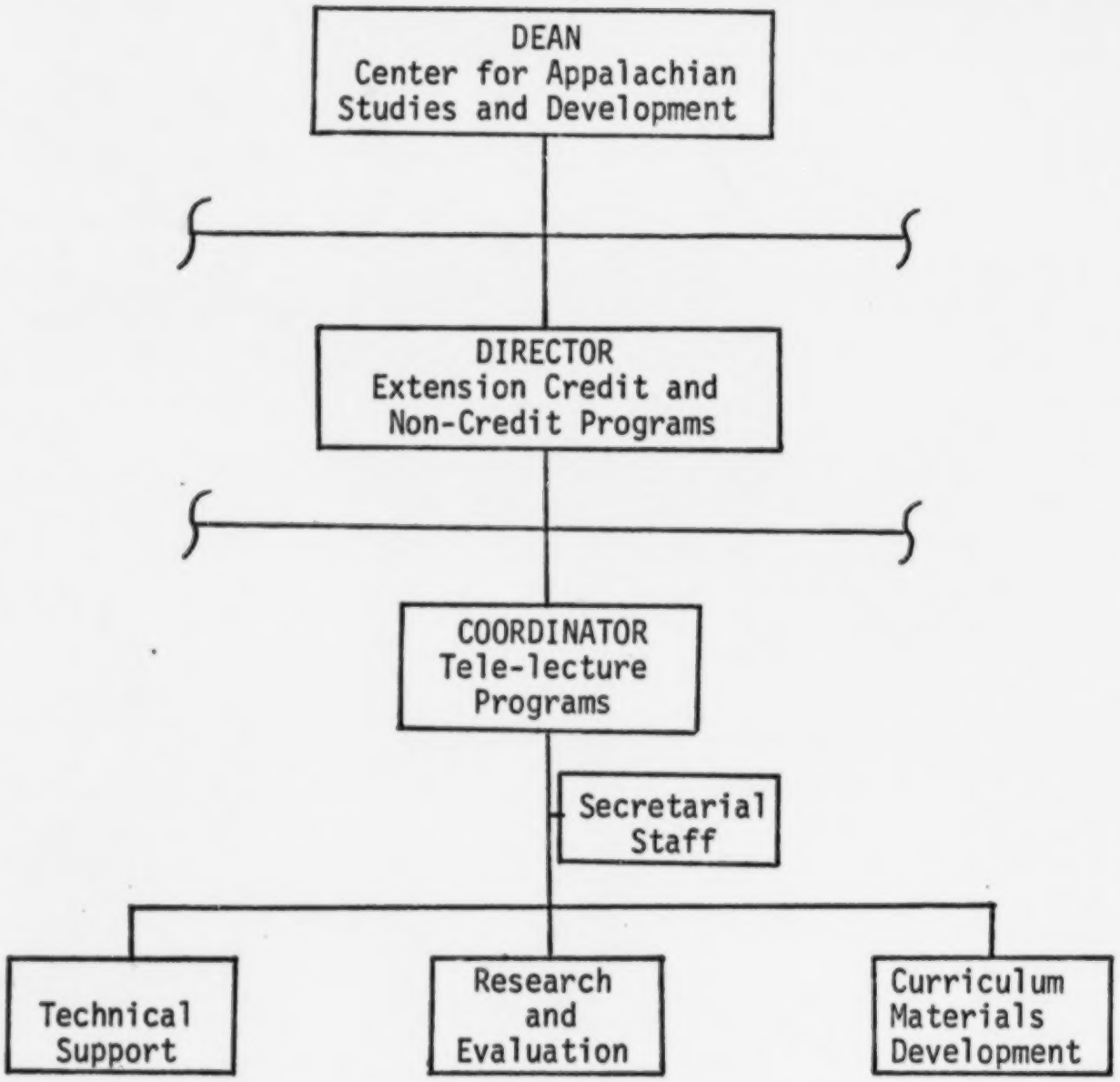

Figure 1

ORGANIZATION OF PROPOSED OFFICE OF TELE-LECTURE PROGRAMMING

within this unit would be primarily technicians, artists, and design personnel.

Curriculum Materials Development Unit. The primary function of the Curriculum Materials Development unit would be to act as an interpretative agent between the professor and the technical support unit. The expertise residing within the Curriculum Materials Development unit should be able to translate a professor's objectives, lectures, goals, etc., into support elements to supplement the tele-lecture. These support elements might include such items as overhead projections, video-tapes, printed materials, etc. Thus, the professor would be backed by a team of professional curriculum materials development personnel and a technical group to assist him/her in providing a tele-lecture program of the highest quality.

Research and Evaluation Unit. The Research and Evaluation unit would be responsible for the continuous review, evaluation, and research as related to tele-lecture. This unit would have responsibilities in providing data and information to the decision-makers of the Center in their efforts to meet the needs of the people served by West Virginia University.

Coordinator, Tele-lecture Programs. The Coordinator, Tele-lecture Programs, would be responsible for managing the Office of Tele-lecture Programs. The Coordinator would act as the in-put and out-put point of the Office. The Coordinator should be directly responsible to the Director, Extension Credit and Non-Credit Programs, and, through the Director, to the Dean, Center for Appalachian Studies and Development. The Coordinator would provide leadership to the total tele-lecture de-

velopment across the University; this would insure that duplication of tele-lecture efforts would be minimized and the University would have a rich resource for future development of tele-lecture programs.

APPENDIX A

West Virginia University | MORGANTOWN, WEST VIRGINIA 26506

College of Human Resources and Education

TO: _____ Students
Beckley, West Virginia

FROM: David A. Puzzuoli

SUBJECT: Evaluation of the Tele-lecture Method in teaching Extension classes

DATE: _____

As students who have experienced an extension class taught through the Tele-lecture Method, you are being asked to participate in an evaluation of the Method. It is imperative that West Virginia University collect relevant data on the Tele-lecture Method in order to plan future use of the Method.

We are requesting your cooperation and time to complete the attached questionnaire. In completing the questionnaire, you should keep in mind that we are evaluating the Tele-lecture Method only. The Tele-lecture Method is being defined as including the electro-writer.

We are not interested, at this time, in evaluating the subject matter presented or the professor. The emphasis is upon the means whereby the class work of _____ was delivered to you. Thank you.

EVALUATION OF THE TELE-LECTURE METHOD
IN TEACHING _____

QUESTIONNAIRE

PART A

Please circle the number which best describes your opinion of each statement by the use of the following scale: 1=strongly agree, 2=agree, 3=undecided, 4=disagree, 5=strongly disagree.

1. The Tele-lecture Method allows student-professor interaction to occur in the classroom. 1 2 3 4 5

2. The Tele-lecture Method allows student-student interaction to occur in the classroom. 1 2 3 4 5

3. The electro-writer functions as effectively as the professor at the blackboard in its use as an instructional tool. 1 2 3 4 5

4. The classroom atmosphere, under the Tele-lecture Method, is comparable to the classroom atmosphere under a "live" professor. 1 2 3 4 5

5. I could have learned as much by reading some books. 1 2 3 4 5

6. The Tele-lecture Method permits individual student conferences with the professor to occur. 1 2 3 4 5

PART B

In items 1 through 3, please circle the option which best describes your opinion.

1. I would enroll in another Tele-lecture course.

   a. Yes b. Undecided c. No

2. For optimal use, the classroom should be acoustically compatible with a Tele-lecture course.

   a. Yes b. Undecided c. No

3. For optimal student interaction in a Tele-lecture course, the classroom should be supplied with an electronic system which allows easy voice contact to the professor by the Student.

   a. Yes b. Undecided c. No

4. The Tele-lecture Method would be more effective if it incorporated more and varied components. (Please check one)

   a. Yes _____ b. No _____

5. If you checked "yes" above, please check one or more of the following components which could increase the effectiveness of the Tele-lecture Method:

   a. The use of the video-tape in presenting selected elements of the course. _____

   b. Providing a number of handouts and/or other printed materials to the students related to the professor's lecture. _____

   c. An extensive use of the audio-visual materials, i.e., films, slides, etc. _____

   d. A number of personal visits to the class, by the professor. _____

   e. Other _____, If you checked "other", please specify_____

   _____

   _____

6. The optimal time for continuous lecturing on the Tele-lecture system, as related to holding students interest, by the professor is: (please check one)

   a. 20-24 minutes _____

   b. 25-44 minutes _____

   c. 45-64 minutes _____

   d. 65-84 minutes _____

   e. 85-104 minutes _____

   f. Other _____

   Please specify_____

   _____

PART C

COMMENTS: Please discuss or list some advantages and disadvantages of the Tele-lecture Method versus the standard classroom procedures for teaching an extension class.

ERIC Clearinghouse
OCT 19 19/0
on Adult Education